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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,698	12/27/2001	Peidong Yang	18062R-004300US	5364

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EXAMINER

WONG, ERIC K

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/032,698

Applicant(s)

YANG ET AL.

Examiner

Eric Wong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 2 the space following the word "and" is indefinite.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-21 and 23-27 are rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent Application Publication 2002/0130311 to Lieber et al.

As to claims 1, 4, 15, and 27, Lieber discloses in the abstract and paragraph 173, a nanowire switching device comprising:

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- A nanowire structure comprising an elongated member having a cross-sectional diameter ranging from about 1 nanometer but less than 300 nanometers;
- A first terminal coupled to a first portion of the nanowire structure;
- A second terminal coupled to a second portion of the nanowire structure, the second portion of the nanowire structure being disposed spatially from the first portion of the nanowire structure; and
- An active surface structure coupled to the nanowire structure, the active surface structure extending from the first portion to the second portion along the elongated member, whereupon the nanowire structure has a first and second electrical value.

As to claim 2, the device is a switch, sensor, chemical sensor, photo-detector, or opto-electronic device (Paragraph 378-396).

As to claim 3, the device is a humidity or oxygen sensor (Paragraph 379).

As to claim 5, the active surface is 90% of the total surface area (Paragraph 282).

As to claim 6, the cross-sectional diameter ranges from 1nm to 500nm (Abstract).

As to claim 7, the structure has an aspect ratio of 10:1000 (Abstract).

As to claims 8 and 26, the nanowire is made of a material that is substantially a single crystal (Paragraph 13).

As to claim 9, the material may be poly-crystalline (Paragraph 9).

As to claims 10, 11, 24 and 25, the semiconductor material is ZnO, SiGe, Si, Ge, GaN, PbSe, or PbS (Paragraph 9).

As to claim 12, the material is spatially separated (Paragraph 200).

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As to claim 13, the nanowire structure is made of a homogeneous material.

As to claim 14, the nanowire is heterogeneous in texture (Figure 3).

As to claims 16-18, the device may be used as a temperature sensor able to operate to temperatures as low as 4.2 degrees Kelvin (Paragraph 246).

As to claims 19-21, such a device as described above also has a first chemical species attached to the structure where an illuminating energy changes the structure from a first to a second electrical state based on magnetic dopants (Paragraph 14).

As to claim 23, the energy is electro-magnetic (paragraph 53).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lieber as applied to claim 1 above.

Lieber discloses a nanowire switching device using chemical species, but fails to explicitly disclose the use of O<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>O, NO or SO<sub>2</sub>.

One skilled in the art would be able to determine from routine experimentation that the use of O<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>O, NO or SO<sub>2</sub> would aid in changing the nanowire structure due to electro-magnetic radiation.

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use a dopant of O<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>O, NO or SO<sub>2</sub> to aid in changing the nanowire structure due to electro-magnetic radiation.

***Inventorship***

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- a. United States Patent Number 6,123,819 to Peeters for a nanoelectrode array.
- b. United States Patent Number 6,438,025 to Skarupo for a magnetic memory device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Wong whose telephone number is 703-305-4741. The examiner can normally be reached on Monday through Friday, 830AM - 430PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 703-308-4819. The fax phone numbers for the

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organization where this application or proceeding is assigned are 703-308-7724 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

EW

June 23, 2003

A handwritten signature in black ink, appearing to read "Brian Healy". The signature is fluid and cursive, with a large loop at the end.

Brian Healy  
Primary Examiner